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SUBMISSION

TO THE

ROYAL COMMISSION ON COAL (1959)

BY

CALGARY POWER LTD.

MARCH, 1960

1950

COAL (1950)

19

CALGARY POWER LTD.

MARCH 1950

Average Return Per Ton of Coal Sold and Labour Cost
1950 - 1959

Year	Steam Coal Mines		Alta. Domestic Underground		Average Wage Plus Benefits Per 8-Hour Shift	
	Realization Per Ton	Index	Realization Per Ton	Index	Index	Index
1950	* \$5.64	100.0	N.A.		\$12.88	100.0
1951	5.77	102.2	N.A.		13.78	107.2
1952	6.19	109.7	N.A.		15.06	117.0
1953	6.38	113.3	N.A.		15.63	121.5
1954	6.48	115.0	N.A.		16.01	124.3
1955	6.29	111.5	N.A.		16.00	124.3
1956	6.32	111.8	* \$7.06	100.0	16.36	127.1
1957	6.39	113.2	7.02	99.4	17.69	137.3
1958	6.11	108.1	6.90	97.8	18.16	141.0
1959	6.26	110.8	6.81	93.2	18.10	140.5

* Source: Dominion Coal Board Annual Reports
Canadian Coal Mine Costs and Revenues

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Miner's Minimum Wage and Consumer Price Index
1950 to 1959

	Wage Increase Per 8-hrs.	Miners Minimum Daily Wage Rate	Wage Index	Consumer Price Index	C. P. I. Index
1950	--	\$10.95	100.0	102.9	100.0
1951	\$0.80	11.75	107.2	113.7	110.5
1952	1.40	13.15	120.0	116.5	113.3
1953	--	13.15	120.0	115.5	112.3
1954	--	13.15	120.0	116.2	113.0
1955	--	13.15	120.0	116.4	113.2
1956	0.50	13.65	124.8	118.1	114.8
1957	0.70	14.35	131.0	121.9	118.6
1958	0.40	14.75	134.7	125.1	121.5
1959	0.40	15.15	138.4	126.5	123.0

Wage and Benefit Costs -- 1950/1959

	<u>Wage & Other Increases</u>		<u>Average Wage Earned Per Shift</u>	<u>Cost of Holiday Pay Per Manshift</u>	<u>Cost of Welfare Fund & Benefit Per Manshift</u>	<u>Total Wage</u>	
	<u>Wage Increase Per 8-hr. Shift</u>	<u>Welfare Fund Contribution Cents/Ton</u>				<u>Cost Per Shift</u>	<u>Index</u>
1950	--	- (15¢)	\$11.70	\$0.42	\$0.76	\$12.88	100.0
1951	\$0.80	- (15¢)	12.52	0.45	0.81	13.78	107.2
1952	1.40	- (15¢)	13.83	0.42	0.81	15.06	117.0
1953	--	5 (20¢)	14.16	0.64	0.83	15.63	121.5
1954	--	- (20¢)	14.32	0.71	0.98	16.01	124.3
1955	--	- (20¢)	14.30	0.70	1.00	16.01	124.3
1956	0.50	2 (22¢)	14.67	0.63 \neq 0.09	0.97	16.36	127.1
1957	0.70	1 (23¢)	15.58	0.74 \neq 0.09	1.28	17.69	137.3
1958	0.40	4 (27¢)	15.66	1.01 \neq 0.09	1.40	18.16	141.0
1959	0.40	- (27¢)	15.83	0.78 \neq 0.09	1.40	18.10	140.5

Comparative Costs of Bituminous Coals
Alberta Mountain Group and Nova Scotia
1950 - 1959

Year	Alberta Mountain				Nova Scotia			
	Cost FOB Cars	Total Cost	Coal Sales	Total Income	Profit or Loss	Total Cost	Coal Sales	Total Income
1950	\$4.79	\$5.61	\$5.64	\$5.83	P. 22¢	\$8.29	\$8.46	\$8.55
1951	4.59	5.37	5.77	5.91	P. 54	8.80	8.76	8.88
1952	5.47	6.13	6.19	6.39	P. 26	10.22	9.40	9.51
1953	5.65	6.30	6.38	6.71	P. 41	10.41	9.41	9.90
1954	5.43	6.42	6.48	6.61	P. 19	9.89	9.53	9.84
1955	5.47	6.53	6.29	6.55	P. 02	9.96	10.33	9.87
1956	5.77	6.53	6.32	6.59	P. 06	9.98	10.09	9.83
1957	6.17	6.94	6.39	6.74	L. 20	10.66	9.53	10.61
1958	5.81	6.68	6.11	6.45	L. 23	10.72	8.57	10.78
1959	N.A.	N.A.	6.26	6.76	N.A.	N.A.	N.A.	N.A.

Source: Dominion Coal Board Annual Reports
Coal Mines Operating Costs and Revenues



Mines Division

STATEMENT SHOWING OUTPUT OF COAL

	FEBRUARY 1960		FEBRUARY 1959
<u>BITUMINOUS FIELD</u>			
Group 1:			
Cascade.....	15832	+ 3,479	12353
Group 2:			
Crowsnest.....	11835	- 19,531	31366
Group 3:			
Coalspur.....	450	- 18,617	19067
Lethbridge.....	8292	+ 2,337	5955
TOTAL BITUMINOUS.....	36409	- 32,332	68741
<u>SUB-BITUMINOUS FIELD</u>			
Group 4:			
Ardley.....	5372	- 832	6204
Brooks.....	1263	- 363	1626
Carbon.....	3015	- 1,770	4785
Champion.....	629	- 279	908
Drumheller.....	32518	- 22,532	55050
Edmonton.....	14275	- 7,885	22160
Gleichen.....	286	- 175	461
Jambina.....	8985	- 6,411	15396
Tabor.....	8479	+ 2,096	4383
Wetaskiwin.....	643	- 96	739
Whitecourt.....	...	- 14	14
Group 5:			
Camrose.....	3794	+ 251	3543
Castor.....	55017	- 10,841	65858
Redcliff.....	147	- 22	169
Sheerness.....	17220	- 94	17314
Tofield.....	1904	- 1,286	3190
Westlock.....	1334	- 166	1500
TOTAL SUB-BITUMINOUS.....	152881	- 50,419	203300
Total Output for the month of February	189,290		272,041
Decrease.....		82,751	
Output up to February 29th.....	460,661		626,260
Decrease.....		165,599	
Valuation for the month of February...	\$875,834		\$1,316,498
Decrease.....		\$442,664	
Valuation up to February 29th.....	\$2,205,628		\$3,096,443
Decrease.....		\$890,815	

J. A. Dutton
J.A. Dutton
Director of Mines

1872

SUBMISSION
TO THE
ROYAL COMMISSION ON COAL (1959)
BY
CALGARY POWER LTD.

For Submission at Hearing
Commencing March 31, 1960
at
Calgary, Alberta.

CALGARY POWER LTD.

DIVISION OFFICES
CAMROSE
EDMONTON
LETHBRIDGE
RED DEER

140 FIRST AVENUE S.W.
CALGARY
ALBERTA

HEAD OFFICE
CALGARY
MAILING ADDRESS
P.O. BOX 190

March 30, 1960.

The Commissioner,
Royal Commission on Coal (1959).

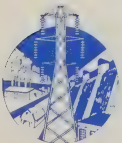
Dear Sir:

We are pleased to submit, for your consideration, the attached brief and accompanying chart and maps on the use of coal in our operations. If you require any further information at our disposal, we shall be glad to furnish it for you.

Yours respectfully,



A.W. Howard
General Manager.



HELPING TO BUILD A BETTER ALBERTA

BRIEF
ON
THE USE OF COAL
IN
THE OPERATIONS OF CALGARY POWER LTD.

1. Alberta is endowed with abundant natural resources, low cost fuel and power and a diversified agricultural output, that will amply support a growing population. Based on these resources, the Province's population and economy has expanded at a high rate since the discovery of the Leduc oil fields. Industry has been attracted by low cost raw materials, power and fuel which enables industrial plants to compete in a substantial export market as well as in a rapidly growing local market.

Alberta has large coal resources. This coal ranges from anthracite to sub-bituminous. Mines were opened years ago in the Crow's Nest Pass, Canmore, Nordegg and Mountain Park areas to furnish bituminous coal to railroads, industries and domestic users. Power plants at Edmonton, Drumheller and Lethbridge formerly burned sub-bituminous coal. The discovery of petroleum and natural gas changed this mining situation and markets for coal to railroads, industries and utilities were lost. This subsequently led to mine closures and to much unemployment in coal mining areas.

During the recent period of expansion in the Province, the use of electricity increased at a high rate. Over the ten year period, 1948 to 1958, the electric load supplied by central electric stations in Alberta, increased from 724 million to 2,475 million kilowatt-hours or by 3.42 times. The average annual rate of increase was 13.2%. This rate of growth is approximately twice that experienced in all Canada over the same period.

The future of Alberta and therefore the demand for electricity is promising. However, the immediate prospects for growth of electrical load are uncertain. High interest rates are likely to slow down industrial development. The current imbalance

of foreign trade, means that Canada is mortgaging the future by selling control of her business and natural resources, to pay for imports, largely of consumer goods. Furthermore, wages are still being pushed up faster than productivity is rising, thereby gradually pricing Canada out of much needed export markets.

In 1959, Calgary Power Ltd.'s load represented nearly two-thirds of the total electric load in the Province. A review of its recent and projected thermal plant expansion program should, therefore, be helpful to the Commission in assessing the potential market for coal in the Province's electric power industry.

In 1959, the Company's load was 1,848 million kilowatt-hours, 45% of this was supplied from eleven hydro plants on the Bow River and its tributaries. Some 41% came from the Wabamun Steam Plant. The remaining 14% was mainly steam power received under existing contracts. Thus over 50% of the Company's 1959 load came from thermal plants and was generated from natural gas.

During 1959 Calgary Power's sales of electric energy were distributed as follows among the various classes of service:

	<u>% of Total Energy Sales</u>
Domestic	8 ✓
Commercial	4 ✓
Small Power (including street lighting)	3 ✓
Wholesale (principally to the City of Calgary)	38 ✓
Industrial	39 ✓
Farms	<u>8</u> ✓
	100

Calgary Power is presently supplying power to 12 coal mines in the Province. The underground operations served are located in the Lethbridge, Crow's Nest Pass, and Canmore areas. The Company also supplied the coal mines in the Nordegg area until these were closed in 1955. The principal strip operations currently served by the

Company are located in the Taber, Camrose, Edmonton and Wabamun areas. Energy sales by the Company to coal mines increased from 11.7 million kilowatt-hours in 1945 to a peak of 38.2 million in 1953 and then fell off to a low of 14.8 million in 1958. During 1959 these sales increased to 17.0 million representing 2.8% of the Company's total industrial sales and 1.0% of its total sales.

2. The Company's early operations were all based on hydro developments. A few years ago several factors such as growth of load, the lack of "close-in" economical hydro sites capable of providing the additional energy requirements, the improved techniques of steam generation and the availability of cheap fuel, made the combination of steam and hydro attractive. Steam plants are designed to carry base loads and water power to carry the peak loads. Additional peaking capacity has been added to several hydro plants that have storage ponds. By purchasing energy from other utilities, and by these peaking additions to hydro plants, the Company postponed building a steam plant until a unit of 66,000 kilowatts could be justified. With such a unit, most of the savings in lower capital cost per kilowatt and in fuel efficiency could be realized.

3. Oil as fuel was too high in cost to be considered. Gas for short term use was available at reasonable cost, but for ultimate use coal was chosen for the following reasons:

- (a) The reserves of bituminous and sub-bituminous coal in Alberta are large compared with the foreseeable market. The cost of coal would seem likely to decrease as mining methods improve and the output of each mine increases. High transportation costs preclude coal shipments to distant markets or for export. Sub-bituminous coal can be used locally in boiler plants whenever their size warrants the use of mechanical coal and ash handling machinery and automatic plant operation.

✓(b) Natural gas on the other hand, can be economically transported long distances by pipe lines and can find a ready and profitable export market. It is a raw material for certain petrochemical processes. By reason of its convenience and cleanliness, it is a premium fuel for domestic use. Its use for purposes for which coal is well suited might be restricted sooner or later.

(c) It was expected that the trend of gas prices in Alberta would follow that in Texas and other gas producing states where, under the stimulus of expanding markets, the field price of gas has been constantly rising. As a result steam plants that were originally gas-fired have been changed to burn Bunker "C" oil or coal. Thus, although an initial saving might be realized in steam plant operation through the use of gas, this would be small as compared with the later extra gas cost that can be expected over the life of the plant. The soundness of this view has already been demonstrated by the field price of gas which has almost doubled in recent years.

4. The Wabamun site was chosen for the steam plant because of ample cooling water, its location on railroad and highway, its proximity to cheaply recoverable strip- mined coal, its favorable location with respect to load centres and transmission facilities, and because the use of a premium fuel like natural gas, is not justified for the generation of electricity when satisfactory low cost coal is available. The dedication of large reserves of gas would have been needed to protect the Company's rapidly ex- panding power demand over the plant's life which in turn would limit the gas available for export or other preferred uses. The advantage to the Provincial and National economy of substituting a local fuel that cannot be exported for natural gas that can be, is thus obvious.

While the Wabamun Project was still in the planning stage, the Company was

Reprint

offered gas in limited quantity for a short period on such favorable was able to defer a substantial capital expenditure required for equ: for firing coal and for opening up the nearby coal mine.

The first 66,000 kilowatt unit was commissioned to burn gas at Wabamun in 1956. A second 66,000 kilowatt unit, also gas-fired, was added in 1958. Both units are designed so that coal-firing equipment can be added later. The third unit at Wabamun of 150,000 kilowatt capacity, is expected to be commissioned in 1962 and will be coal-fired only. One of the existing 66,000 kilowatt units will probably be converted to coal-firing in 1963 but the other one is likely to be left on gas for some time. For maximum economy the coal-fired units will be loaded to capacity. The remaining gas-fired unit will carry any balance of load that cannot be generated by the hydro plants. This base loading of the coal-fired units will lead to maximum plant efficiency and to the best utilization of the available fuels.

5. Full-scale tests of all seams of Wabamun coal have recently been completed at the Battle River Plant of Canadian Utilities. These tests show that all the Wabamun seams have excellent firing qualities.

6. The Wabamun mine will be in production in 1962. The Company has recently purchased a 35 cubic yard dragline excavator capable of stripping some 2,500,000 tons of Wabamun coal per year. Loading shovels, coal hauling trucks, a coal breaker, coal handling machinery, etc. will be ordered shortly. The 150,000 kilowatt unit will require 700,000 tons of coal per year. With the conversion of one of the 66,000 kilowatt units to coal in 1963, the output of the mine will be increased to 1,000,000 tons per year. While the cost per ton of this 1,000,000 tons will be somewhat high due to the higher initial costs of the large dragline, it is estimated that the incremental cost of the additional 1,500,000 tons per year, up to the full capacity of the dragline, will be less than a dollar a ton delivered at the power plant.

7. The Wabamun operation will obviously be of no help to the existing coal industry in Alberta. If it is a case of keeping a bituminous coal mine going as a

future source of coal for metallurgical, chemical or other use, by using some coal in the meantime for generating electricity, the real competition will come from coal produced by strip mining. Assume by way of an example that bituminous coal has a heat value of 12,500 BTU per pound while the Wabamun coal has 7,500 BTU per pound. Then three tons of bituminous coal would be the equivalent in heat value to five tons of Wabamun coal. The break-even price of equivalent bituminous coal to the one dollar per ton cost of Wabamun coal would be \$1.67 per ton delivered at the stockpile of the Wabamun Plant. However, the purchase of bituminous coal for the power plant would conserve the Company's own coal reserves and postpone the day when the Company's coal costs would be increased by having to go farther afield for fuel for the Wabamun operation. On this account and considering the slightly greater efficiency when burning bituminous coal, the less pulverizing cost and decreased plant maintenance, the Company might be justified in paying as high as \$2.00 per ton for bituminous coal delivered at the Wabamun stockpile.

8. The recent commencement of the construction of the Big Bend Storage and Hydro Power Plant on the Brazeau River and the 150,000 kilowatt extension scheduled for Wabamun will have the effect of delaying the commissioning by Calgary Power of any further thermal capacity until 1966 or 1967 at the earliest.

In view of the large amount of peak load power that will be made available from the Big Bend Hydro Plant on the Brazeau, the Company is embarking on the construction of high voltage lines to transmit the power from this Plant and from the Wabamun Plant to the main load centres of Calgary and Edmonton. The present transmission system from the hydro plants in the Bow River watershed is sufficient for delivery of the power generated at those plants to consuming areas. Furthermore, the capacity of these new lines can be increased, if required, to transmit the output of further units at Wabamun at small additional cost. There is, therefore, little prospect of a steam plant in the southern part of the Province resulting in any substantial savings.

9. If it is necessary for the Government to build up a market for bituminous coal in order to keep the mines intact, the most practical plan would seem to be the shipment of this coal by the Government to the Wabamun Plant for burning there and charging the Company \$2.00 per ton for the delivered coal. There would also be some small expense at Wabamun in providing means for delivering the coal from cars to the receiving hoppers at the Plant. A special freight rate from mine to Plant might be negotiated along the same lines as that to Ontario markets, or the export coal to Japan. The Government would have to absorb this freight charge. While this would be more costly per ton than the subvention for a mine-mouth plant, it would have the advantage to the Government that, up to the requirements of the Power Plant, the tonnage could be made to suit the needs of the mine, and could be adjusted or discontinued altogether on short notice whenever a more lucrative market appeared.

10. The export of power to the Northwestern States might justify a new steam plant in the south, but this would appear to be at least ten years from now because of hydro plants now under construction or contemplated in that area. A steam plant in the Crow's Nest Pass area would have an advantage over power from Wabamun for service to the Columbia River System since the economic and technical problems of electrical transmission for distances over three hundred miles or so, compound rapidly.

The larger power projects on the United States section of the Columbia River were started during the nineteen thirties as make-work programs with Government funds at low interest rates. A considerable portion of the cost of these projects was charged to flood control, irrigation, navigation and recreational benefits. Recent financing has been done through Public Utility District debentures bearing low rates of interest and exempt from State and Federal income taxes. As a result, power is being sold as low as \$17.50 per kilowatt-year which is only slightly above what fuel alone would cost in the Crow's Nest Pass area. With a settlement of the Columbia River

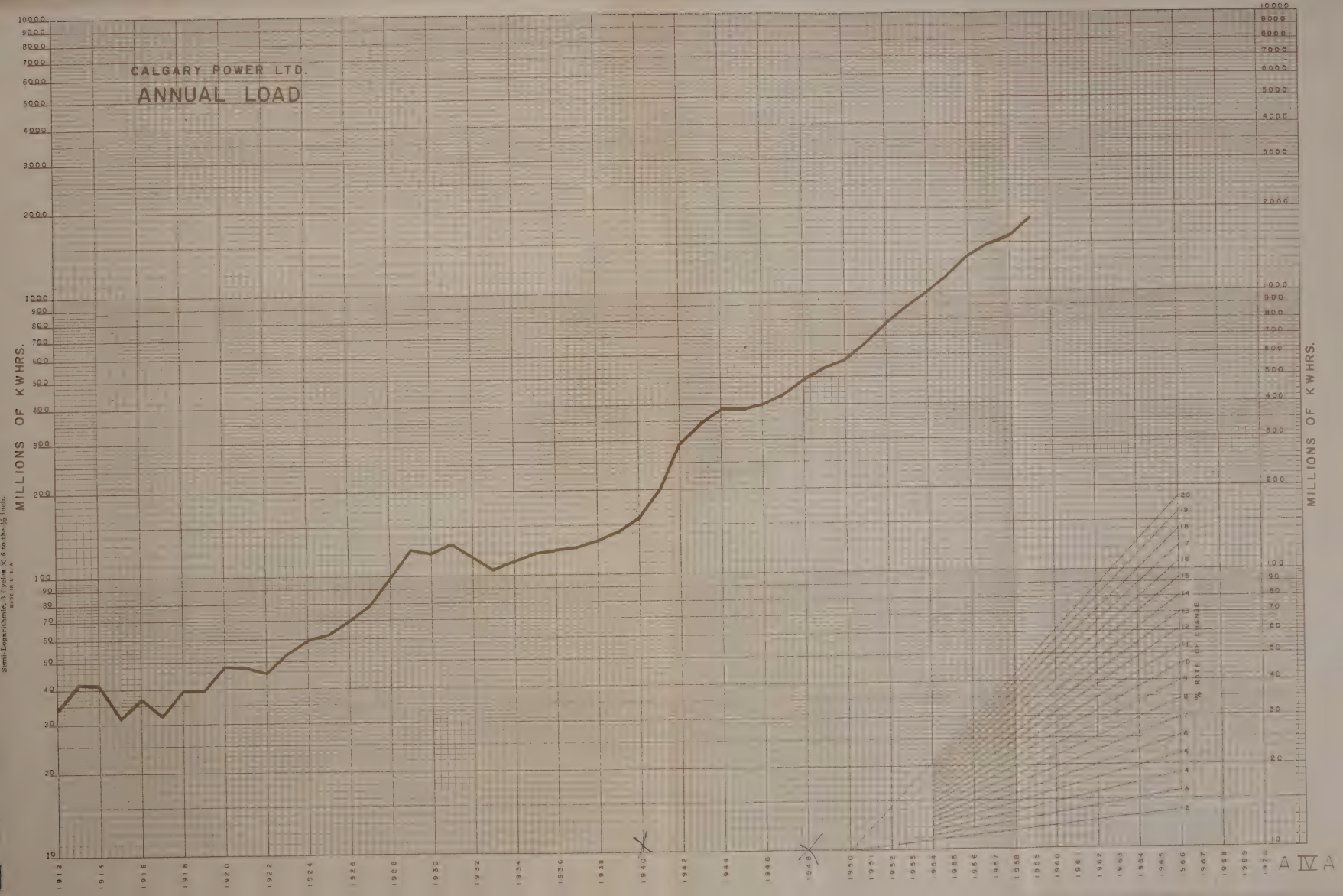
power situation in the offing, the prospects of selling steam generated energy to the Northwestern States in any quantity, would seem remote.

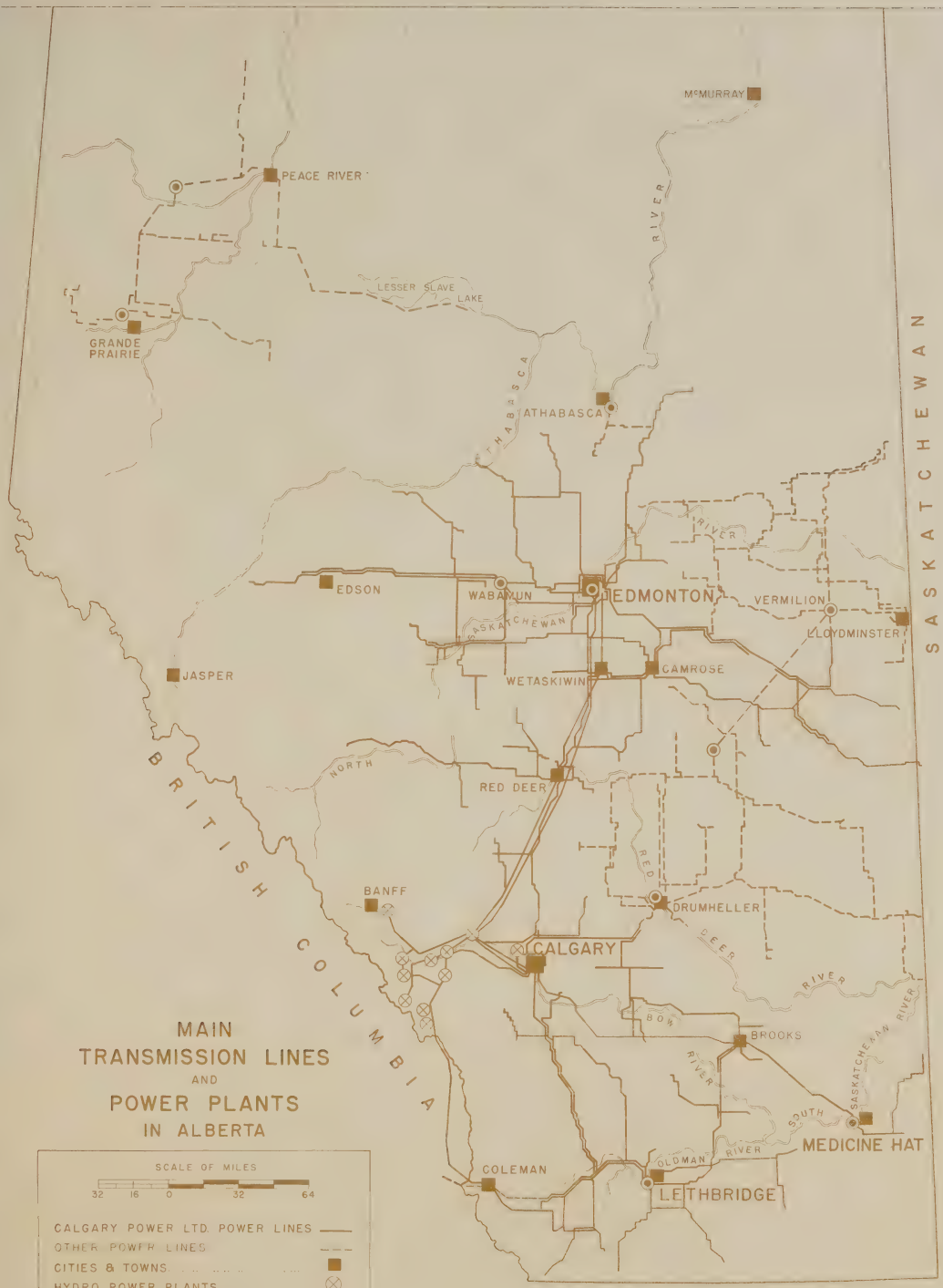
11. The Company recognizes the importance to the national economy of having high grade bituminous coal available for metallurgical purposes and is willing and anxious to do whatever it can to assist in keeping the bituminous coal industry going through the present crisis. It will be appreciated, however, that the Company could not, nor would it be permitted to, without the approval of the Board of Public Utility Commissioners, increase the prospective cost of service to its customers. As the crisis in the bituminous coal industry would seem likely to be of reasonably short duration compared to the life of a steam power plant, the temporary use of bituminous coal in the Wabamun Plant would seem, in our opinion, to be an answer as far as the Government is concerned. While requiring temporarily a large subvention, it has the advantage of flexibility and no long-term commitment is required.

March 30, 1960.

Small Logarithmic, 3 Cycles X 6 to the 1/2 inch.
Scale 1:1

CALGARY POWER LTD. ANNUAL LOAD





MAIN
TRANSMISSION LINES
AND
POWER PLANTS
IN ALBERTA



- | | |
|--------------------------------|-------|
| CALGARY POWER LTD. POWER LINES | — |
| OTHER POWER LINES | - - - |
| CITIES & TOWNS | ■ |
| HYDRO POWER PLANTS | ⊗ |
| THERMAL POWER PLANTS | ● |

PRINCIPAL ELECTRICAL FACILITIES

IN
PACIFIC NORTH WESTERN UNITED STATES
BRITISH COLUMBIA AND ALBERTA

SCALE OF MILES
0 10 20 30 40 50 60
0 10 20 30 40 Miles to 1 inch

LEGEND

- 185,000 VOLTS AND OVER
- - - - 80,000 TO 185,000 VOLTS
- · — · 58,000 TO 79,000 VOLTS
- · — · CONNECTION BETWEEN COMPANIES
- FUEL
- HYDRO
- △ SUBSTATIONS

